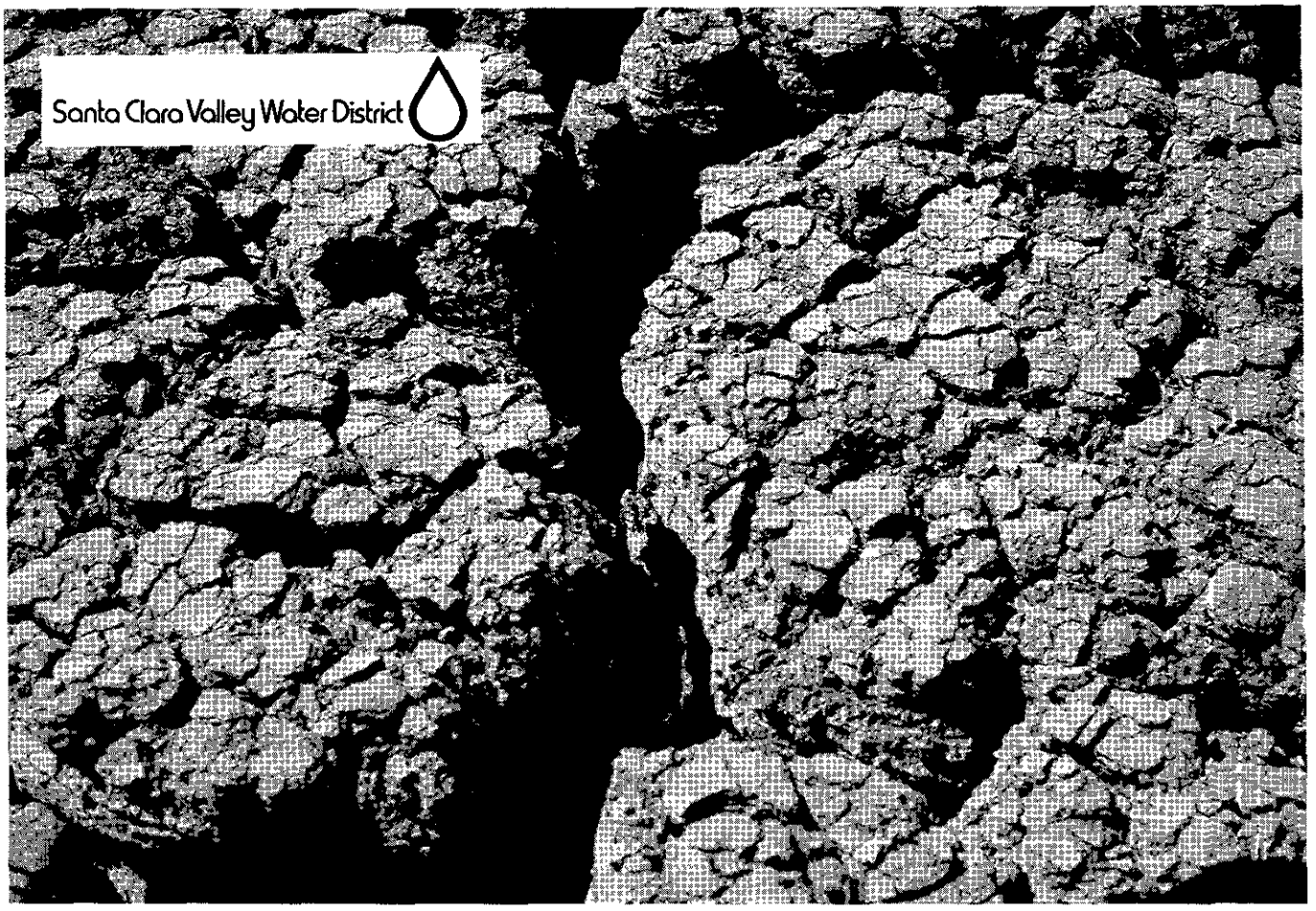
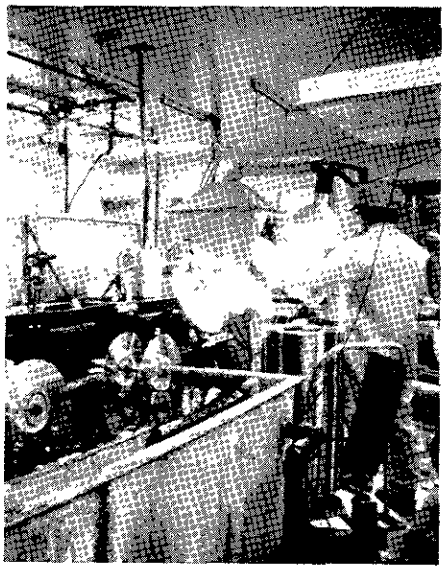
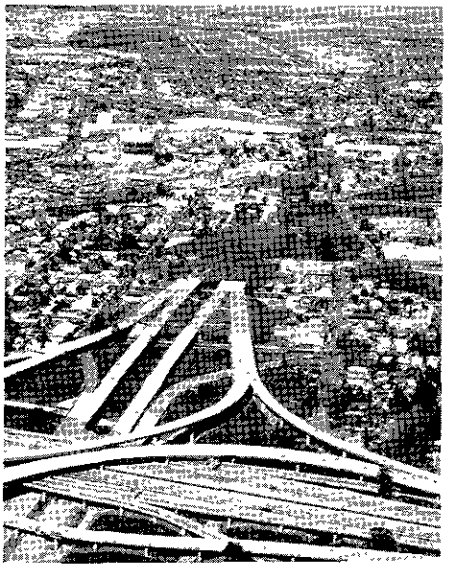
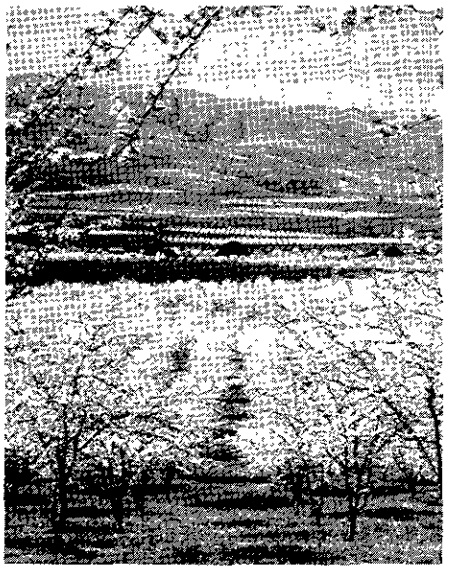
BAT



1989 DROUGHT PLAN







SANTA CLARA VALLEY WATER DISTRICT

1989 DROUGHT PLAN

prepared by

The Drought Committee

Amy Fowler
Nicholas Lyn
John Sutcliffe, Chair
Richard Gates
Theodora Morse
Walter Wadlow

Under the direction of

Roger B. James
Operations and Water Quality Manager

and

Leo F. Cournoyer
Water Supply Manager

John T. O'Halloran
General Manager

March 1, 1989

ACKNOWLEDGEMENTS

The Drought Committee wishes to commend the Water Supply Subcommittee of the Retail Water Agencies for its cooperation and assistance in formulating this Plan.

Water Supply Subcommittee Members:

Dick Hathorn	City of Santa Clara
Dick Balocco	San Jose Water Company
Bill Weisend, Chair	City of Sunnyvale
Dennis Futamase	City of San Jose
Steve Machida	City of Morgan Hill
Gary Bentsen	City of Milpitas

As the seriousness of the drought became more apparent, other members of the Retail Water Agencies also attended Subcommittee meetings and contributed many valuable suggestions.

Cover

The cover of the report is intended to remind readers that water shortage affects everyone in Santa Clara County; it's not a problem that belongs to just one part of the County or one segment of the economy. The success of any drought plan depends on the cooperation of each industry, agricultural grower, government, business and resident in Santa Clara County.

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APPENDICES

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EXECUTIVE SUMMARY

Santa Clara County is facing its third consecutive year of below average rainfall, and water supplies from local and imported sources are not sufficient to meet current water needs.

As of March 1, 1989, rainfall is about 53% of average. Local reservoir storage is at an all time low at 7% of capacity.

The District requested its maximum entitlement of 227,500 acre feet from State and Bureau of Reclamation water projects. The Bureau has responded with a 50% cut, and the State may respond with up to a 15% cut depending on the March snow surveys in the Sierra. The total supply available from these two sources is thus expected to be somewhere between 145,000 and 205,000 acre feet. Several cities in the County receive water from San Francisco's Hetch Hetchy Aqueduct, and there may be cutbacks from this source as well.

Water needs not met by imported supplies are met by groundwater pumping. The groundwater basin, which is normally recharged to provide over half of the County's annual water needs, was overdrafted by 52,000 acre feet in 1988. Groundwater levels have been steadily declining and in many areas are dangerously close to the 1968 levels associated with land surface subsidence. Subsidence would have severe economic, public health and safety consequences that would impact the entire County.

Faced with a 50% reduction in imported supplies from the Bureau of Reclamation's San Felipe Project, and considering the minimal rainfall to date, the District's Board of Directors on February 21, 1989, officially proclaimed the 1988-89 water year a drought year in Santa Clara County. The Board endorsed water use reduction measures which, in combination with water allocations and enforcement, are needed to accomplish a 45% reduction in use from 1987 levels, effective April 1.

The District is actively pursuing augmentation of its imported supplies, but at this time no commitments or agreements have been obtained. The Retail Water Agencies' Water Supply Subcommittee has encouraged the District to first allocate any additional water to groundwater recharge to minimize overdraft and to prepare for a possible fourth year of drought. The Subcommittee also encouraged the District to consider allocating any additional water to retail water agencies for mitigation of individual hardship cases, primarily to protect jobs. Should additional water become available later in the year, the District's Board will reevaluate the allocations which are currently being recommended in this Plan.

INTRODUCTION

A major role of the Santa Clara Valley Water District is to properly manage the local and imported water resources in Santa Clara County for the overall benefit of the community. The purpose of this report is to describe the current status of water supply needs and resources, and to recommend appropriate management techniques during periods of drought or shortage.

Santa Clara County has experienced two successive years (1987, 1988) of below average rainfall, which have seriously depleted local water resources. This condition, together with minimal local carryover storage, has resulted in a groundwater extraction rate in excess of groundwater recharge. A third year of below average rainfall will further exacerbate the declining groundwater levels and threatens further irreversible land surface subsidence.

To manage the impact of a third below average rainfall year the Santa Clara Valley Water District Board of Directors has directed that a drought management plan be developed. The District Drought Committee has worked closely with imported water supply contractors and local water retailers to develop this plan. The plan includes local water needs, 1989 surface water and groundwater conditions, as well as the anticipated local and imported supplies. The plan also points out the need for long range conservation and drought planning.

The report makes recommendations as to the District's 1989 operating plan, media campaign, and water use reduction measures. In addition, the report contains suggestions intended to help local water purveyors and city governments implement their own water use reduction programs and ordinances.

WATER NEEDS

Overall water use in Santa Clara County has been steadily increasing since the early 1900's. Early needs were met by constructing wells which gradually were deepened as the shallow sources were depleted.

To augment the groundwater supply, reservoirs were constructed during the 1930's and 1950's to capture local runoff that could be used for surface diversions and groundwater recharge. Groundwater recharge would not only augment the groundwater supply, but mitigate the impact that falling water levels were having on land surface subsidence.

The first imported water was delivered to Santa Clara County in the early 1950's when certain north county cities began receiving water from San Francisco's Hetch Hetchy Aqueduct to supplement their groundwater sources.

In 1965 deliveries from the State Water Project entered the County to further augment decreasing ground water levels and to provide a source of treated surface water for delivery to local retailers.

Over the past 20 years, water use in the northern part of the County has increased 60%, from 200,000 acre feet in 1967 to 345,000 acre feet in 1987. Figure 1 illustrates this increase, and shows a breakdown of total use by source.

In 1987, the District received its first deliveries of Bureau of Reclamation San Felipe Project water. This additional source, together with other imported and local supplies, is expected under normal circumstances to meet countywide water needs through the year 2020.

The years 1987 and 1988 had below average rainfall, and thus far 1989 is repeating this hydrology. If this trend continues, the County will not be able to meet local water use demands even with imported supplies, without seriously overdrafting the groundwater basin or implementing a comprehensive water use reduction program.

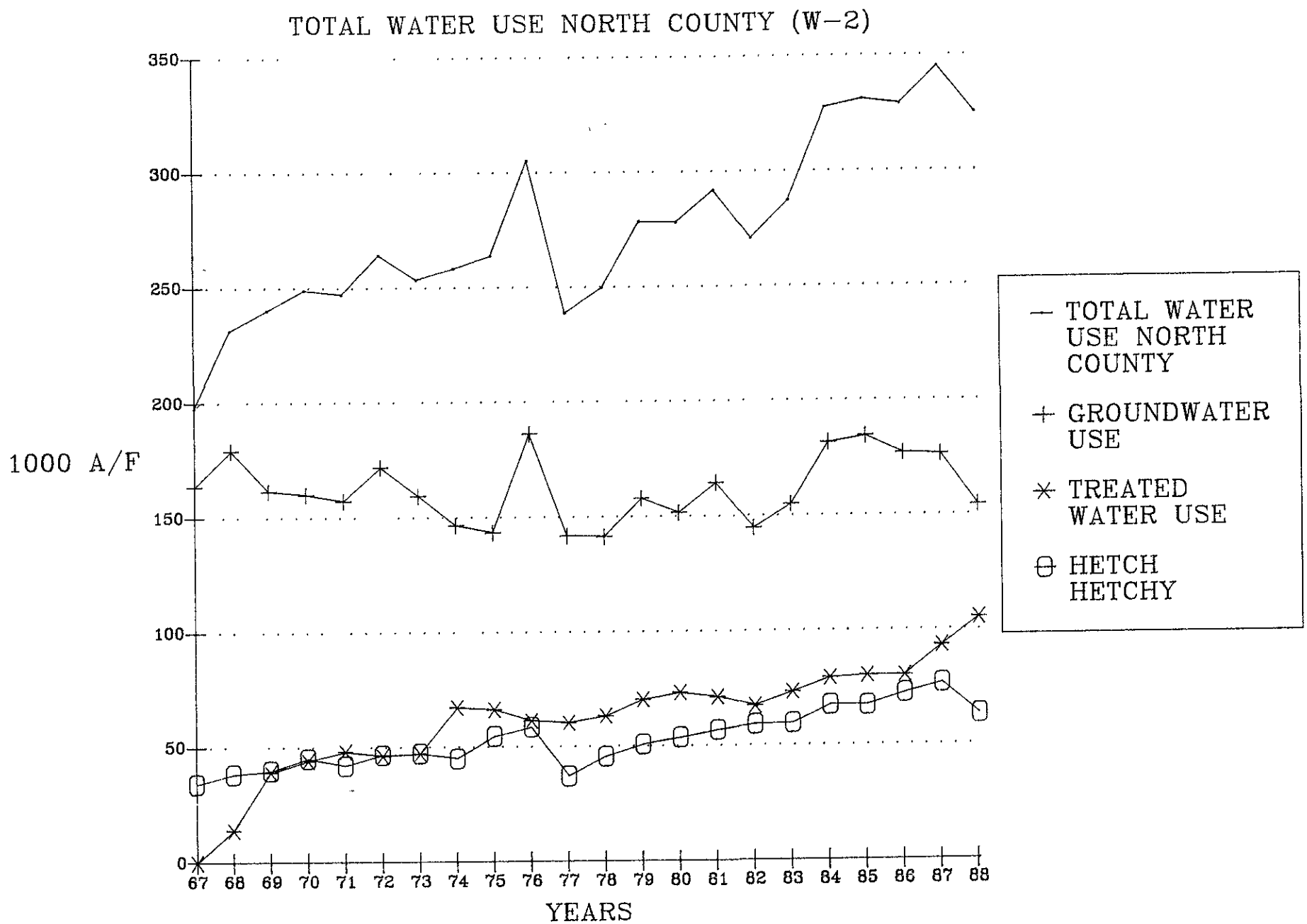

TOTAL WATER USE NORTH COUNTY (W-2)
1000 A/F
350
300
250
200
150
100
50
0
67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88
YEARS
TOTAL WATER USE NORTH COUNTY
GROUNDWATER USE
TREATED WATER USE
HETCH HETCHY

FIGURE 1

STATUS OF RESOURCES

As of February 9, 1989, the rainfall in California ranged from 56% to 92% of normal. The total state wide reservoir storage on February 1 was 15.9 million acre feet (maf), 67% of average, or about 6.0 maf less than in 1988. The current snow survey indicates a depth which is slightly greater than in 1988 at the same time.

The District has requested its maximum entitlement of 227,500 acre feet (137,500 acre feet from the Bureau of Reclamation and 90,000 from the State Water Project) or about 60,000 acre feet more than was imported during 1988. In February, the Bureau of Reclamation responded that the District should expect to receive half its requested amount, or 69,000 acre feet. The State has indicated that the District may receive a cut of up to 15%, depending on the March snow survey. Thus, the District is anticipating total imported water deliveries ranging from 145,000 to 205,000 acre feet during 1989. Currently it is expected that 50,000 acre feet of Hetch Hetchy water will be available to the County during 1989 as compared with the 63,000 acre feet used in 1988.

As of March 1, 1989, the county has received about 40% of the total annual average rainfall, as compared with an average year when 75% of the total is received by the same date (see Figure 2). The 1988-89 cumulative total as illustrated in Figure 3 is 53% of the average to date, and is less than the same total during the 1987-88 rainfall year.

Reservoir storage is directly related to rainfall runoff. Runoff normally occurs after a period during which the soil becomes saturated, with any additional rainfall then contributing to runoff. In 1987-88, saturation did not take place, and runoff was one of the lowest on record. In 1988-89 runoff has been essentially non-existent to date. As a result, total reservoir storage on March 1 is less than 7% of capacity, the least ever experienced by this date, and most of this is carryover storage of imported San Felipe water.

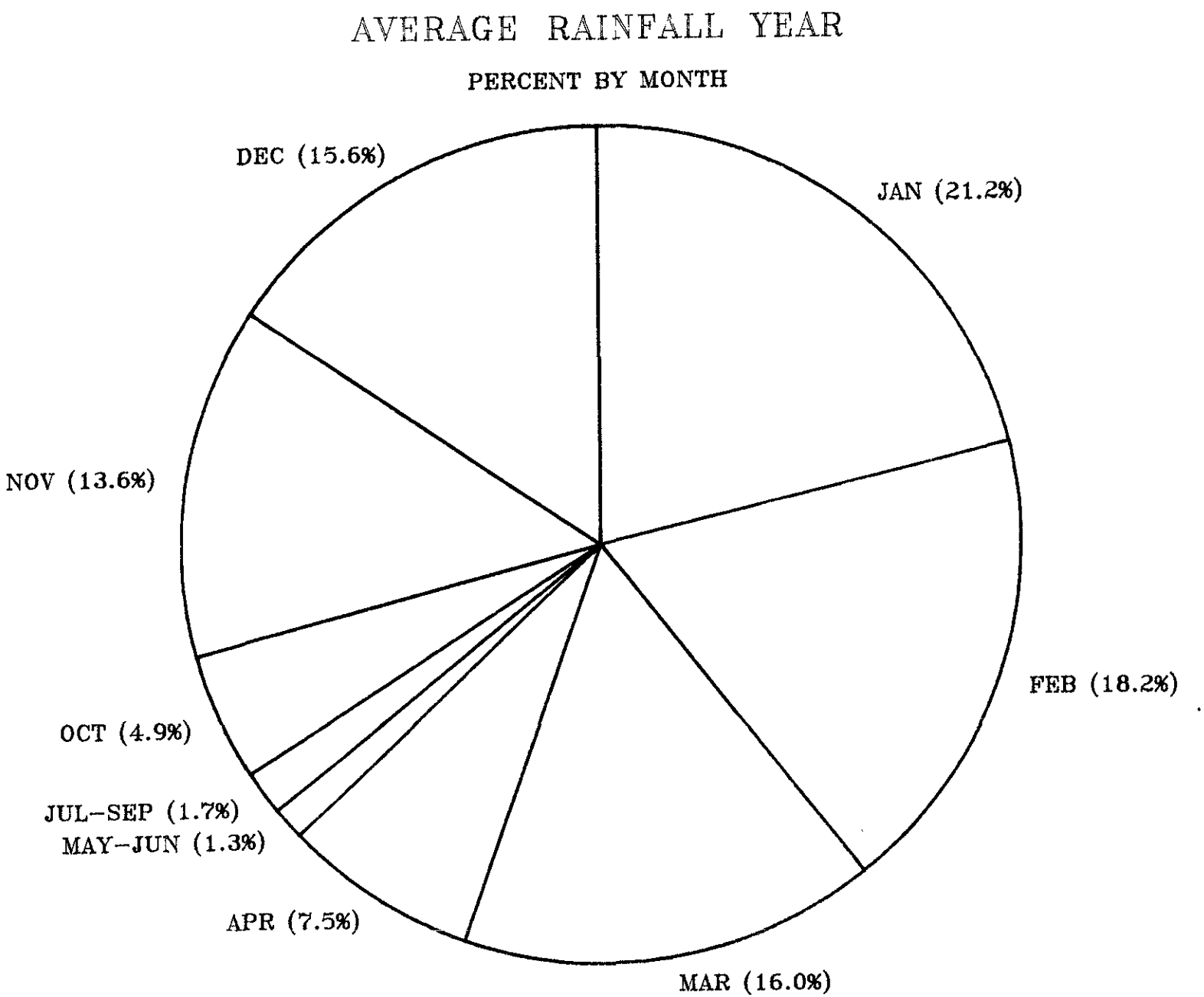

AVERAGE RAINFALL YEAR
PERCENT BY MONTH
DEC (15.6%)
JAN (21.2%)
NOV (13.6%)
FEB (18.2%)
OCT (4.9%)
JUL-SEP (1.7%)
MAY-JUN (1.3%)
APR (7.5%)
MAR (16.0%)

FIGURE 2

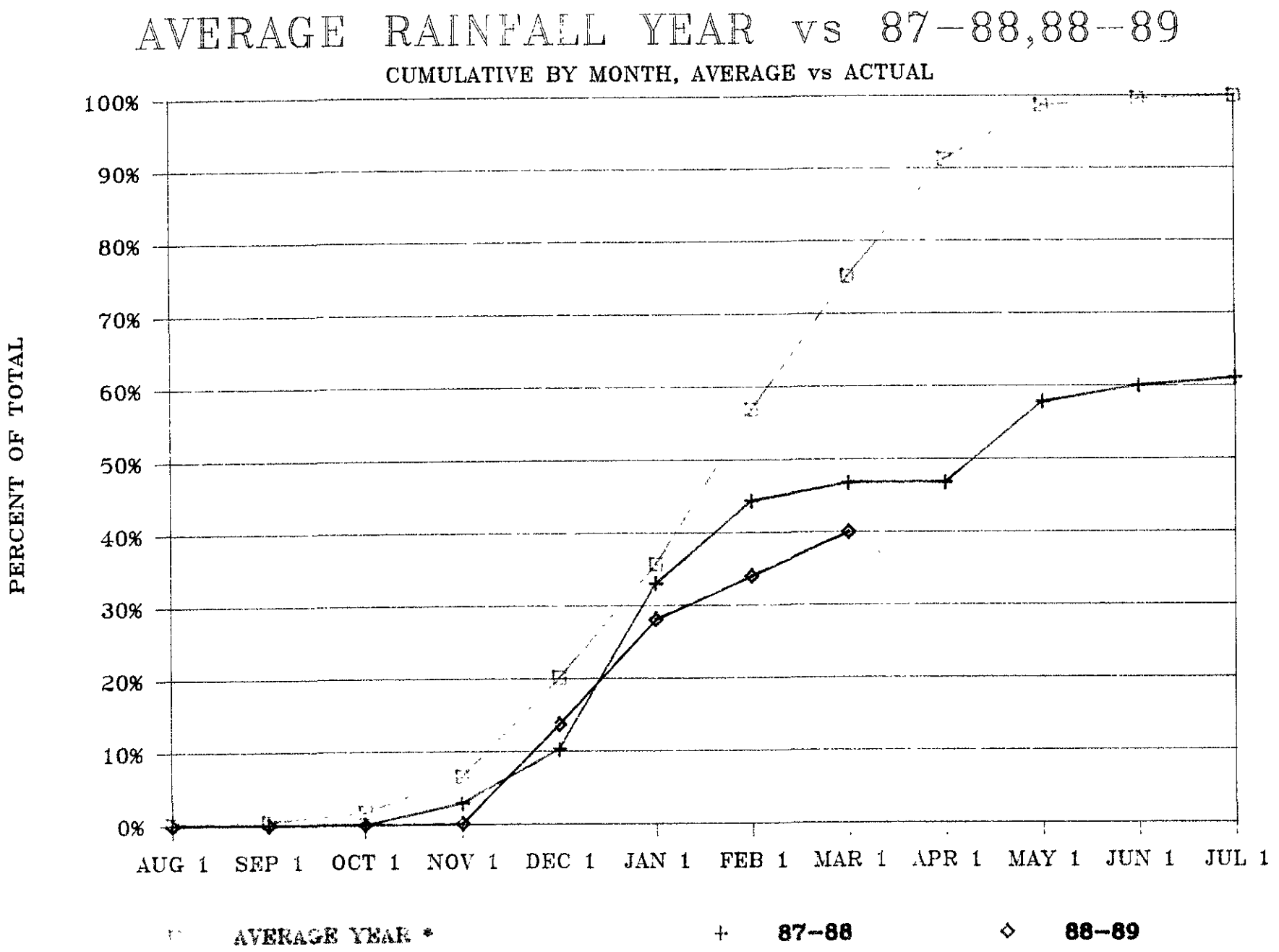

AVERAGE RAINFALL YEAR vs 87-88,88-89
CUMULATIVE BY MONTH, AVERAGE vs ACTUAL
PERCENT OF TOTAL
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
AUG 1
SEP 1
OCT 1
NOV 1
DEC 1
JAN 1
FEB 1
MAR 1
APR 1
MAY 1
JUN 1
JUL 1
AVERAGE YEAR *
87-88
88-89

FIGURE 3

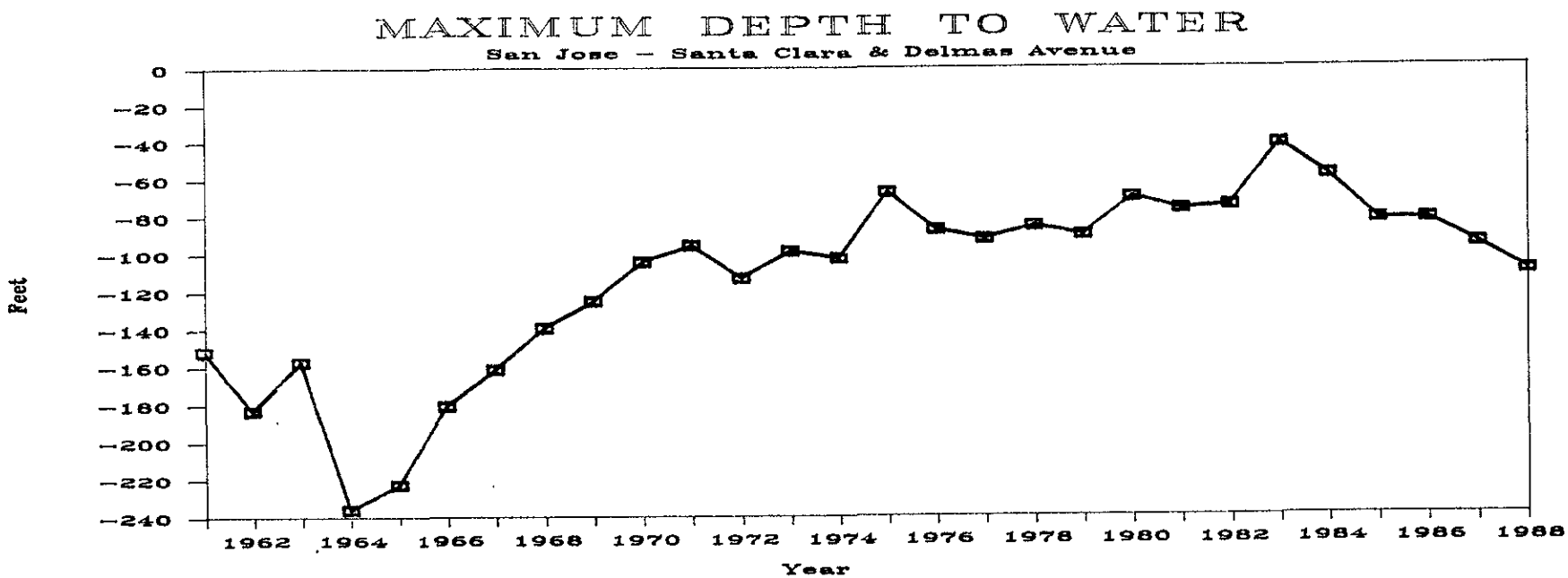
Rainfall as well as local and imported water supplies play a significant role in recharging the groundwater basin, and thereby reducing groundwater overdraft.

Before State Water Project water was introduced to Santa Clara County in 1965, the groundwater was being seriously overdrafted and land surface subsidence was occurring. This subsidence, up to 13 feet in some areas of downtown San Jose, has caused an enormous amount of damage associated with flood protection, drainage facilities, collapsed wells, saltwater intrusion, and changes in grades of pipelines, streets and highways. Over 200 well casings were collapsed. In U.S. Geological Survey Paper 497-F, J. F. Poland estimated that 800,000 acre feet in underground storage capacity was lost permanently.

Since imported deliveries began there has been an upward trend in groundwater levels, and a virtual elimination of subsidence conditions. However, the last two years of below average rainfall has resulted in groundwater overdrafting and a decline in groundwater levels. Should this trend continue there is a high probability of a return to significant subsidence conditions.

The groundwater level in one San Jose well is compared in Figure 4 with the annual compaction that has been taking place in a USGS well about 1.6 miles from the San Jose well. A close correlation between compaction and subsidence has been demonstrated in the USGS well. The subsurface compaction measurements in this well indicate that a small amount of subsidence has occurred during the past five years as groundwater levels have been declining.

The long term trends in depth to water in each of the three principal groundwater subbasins in Santa Clara County are illustrated in Appendix A.


MAXIMUM DEPTH TO WATER
San Jose - Santa Clara & Delmas Avenue
Feet
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
-240
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
Year

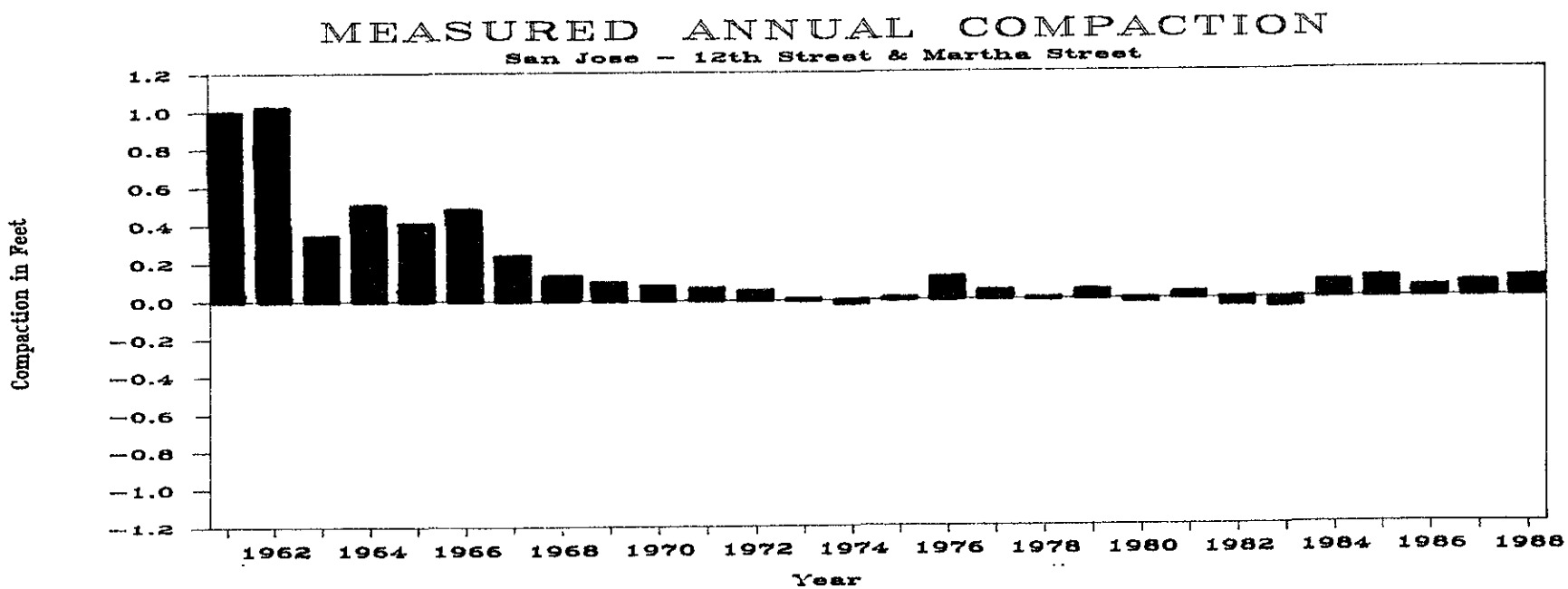

MEASURED ANNUAL COMPACTION
San Jose - 12th Street & Martha Street
Compaction in Feet
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
Year

FIGURE 4

LOCAL SURFACE WATER CONDITIONS

This section summarizes the surface water supply and distribution that occurred in 1988 and projects the supply and distribution for 1989. Assuming a locally dry year, 50% reduction in Federal water deliveries and a 15% reduction in State deliveries, the total surface water supply projected for 1989 is about 205,000 acre feet, which is about 43,000 acre feet less than was available during 1988 (see Figure 5). At this time, the Department of Water Resources has approved the District's 1989 request for 90,000 acre feet. However, it is likely that this approved amount will be reduced should runoff run short of projections. In November 1988, the District's Board of Directors became concerned about local surface water supplies and directed staff to request maximum Federal entitlement deliveries of 137,500 acre feet for 1989. The most recent indications from the Bureau are that the District's 1989 request will be reduced by 50% to about 69,000 acre feet.

In light of the severe impact that continued drought and reduced San Felipe deliveries will have on Santa Clara County, the District is currently pursuing restoration of a portion of the 50% reduction. The District is also actively seeking other sources of water which may be available in the State this year, but at this time no commitments or agreements have been obtained.

The District prepared plans and received State approval for a temporary siphon from Calero Reservoir to bypass existing capacity constraints and make full use of any additional imported water supplies that may become available for delivery through the San Felipe Division.

1988 Water Supply and Distribution

Carryover storage at the beginning of 1988 was 14,400 acre feet, one of the lowest ever experienced in Santa Clara County. Aside from water in Uvas and Chesbro Reservoirs, all carryover storage was imported San Felipe project water.

Local overall reservoir inflow in 1988 was only 3,000 acre feet compared with an "average" annual inflow of about 100,000 acre feet.

In 1988 the District imported 88,000 acre feet of water from the State Water Project, which was the full entitlement available in 1988. The District also imported 80,000 acre feet of water from the San Felipe Division of the Central Valley Project which was 40,000 acre feet more than was originally requested for 1988. Hetch-Hetchy deliveries totaled about 63,000 acre feet which was about 13,000 acre feet more than was projected early in 1988.

Of the total 1988 surface water supply of 248,400 acre feet, about 105,000 acre feet was delivered as treated water. About 66% was delivered as contract treated water. The remaining 34% was delivered as non-contract water to the retail agencies on an as-available basis from the Rinconada and Penitencia water treatment plants. About 74,000 acre feet was recharged. Approximately 52% of the recharge occurred in the Guadalupe, Los Gatos and Stevens Creek recharge systems. The carryover storage into 1989 was about 7,000 acre feet. This is nearly all imported San Felipe water and represents the lowest carryover storage ever. The 1988 surface water supply and distribution are summarized in Figure 5.

1989 Water Supply and Distribution

The 1989 water supply plan, as shown in Figure 6, assumes the same dry conditions as 1988. Based on rainfall and runoff to March 1, which are less than in 1988, this appears to be a reasonable assumption. Local runoff represents the largest unknown in terms of supply since this number could potentially exceed 150,000 acre feet under wet conditions. However, an extremely heavy rainfall volume would need to occur during the remaining months of the rainy season for this level of runoff to be achieved.

The State has approved the District's request for 90,000 acre feet of water. However, if March continues to be dry, it is likely that this figure will be revised downward based on the March snow survey. The most recent information from the Department of Water Resources indicates that state agricultural contractors are likely to experience a reduction in entitlement deliveries for 1989 in excess of 40%. Should agricultural users receive a reduction in excess of 50%,

1988

SURFACE WATER SUPPLY AND DISTRIBUTION
IN SANTA CLARA COUNTY

WATER SUPPLY

JANUARY 1 RESERVOIR CARRYOVER STORAGE	14,400	
LOCAL RESERVOIR INFLOW	3,000	
STATE WATER PROJECT DELIVERIES	88,000	
SAN FELIPE DIVISION DELIVERIES	80,000	
HETCH-HETCHY DELIVERIES	63,000	
TOTAL WATER SUPPLY	248,400	

WATER DISTRIBUTION

CONTRACT TREATED WATER DELIVERIES	69,300	104,600
NON-CONTRACT TREATED WATER DELIVERIES	35,300	
GROUNDWATER RECHARGE - FROM UVAS AND CHESBRO	6,600	73,800
GROUNDWATER RECHARGE - COYOTE SYSTEM	30,000	
GROUNDWATER RECHARGE - WEST SIDE	37,200	
HETCHY-HETCHY USE	63,000	
CARRYOVER STORAGE	7,000	
TOTAL WATER DISTRIBUTION - ACRE FEET	248,400	

Figure 5

1989

SURFACE WATER SUPPLY AND DISTRIBUTION
IN SANTA CLARA COUNTY

WATER SUPPLY

	REPEAT 1988 HYDROLOGY 50% SAN FELIPE & 85% STATE	POSSIBLE RANGE OF SUPPLY DEPENDING ON 1989 HYDROLOGY	
JANUARY 1 RESERVOIR CARRYOVER STORAGE	7,000	7,000	
LOCAL RESERVOIR INFLOW	3,000	1,000 - 200,000	(See Note 1)*
STATE WATER PROJECT DELIVERIES	76,000	76,000 - 90,000	(See Note 2)*
SAN FELIPE DIVISION DELIVERIES	69,000	69,000 - 115,000	(See Note 3)*
HETCH-HETCHY DELIVERIES	50,000	38,000 - 50,000	(See Note 4)*
TOTAL WATER SUPPLY	**205,000**	**191,000 - 462,000**	

WATER DISTRIBUTION

CONTRACT TREATED WATER DELIVERIES	90,000 \	125,000
NON-CONTRACT TREATED WATER DELIVERIES	35,000 /	
GROUNDWATER RECHARGE - FROM UVAS AND CHESBRO	0 \	27,000
GROUNDWATER RECHARGE - COYOTE SYSTEM	16,000	
GROUNDWATER RECHARGE - WEST SIDE	11,000 /	
HETCHY-HETCHY USE	50,000	
CARRYOVER STORAGE	3,000	
TOTAL WATER DISTRIBUTION - ACRE FEET	**205,000**	

*Notes on following page.

Figure 6

Figure 6, continued

1989
SURFACE WATER SUPPLY AND DISTRIBUTION IN SANTA CLARA COUNTY

Notes:

1. Maximum figure represents approximate runoff experienced in 1986 from February on.
2. Minimum figure assumes a 15% reduction in State deliveries. Any reduction in State deliveries can not be reliably estimated at this time.
3. Minimum figure represents a 50% reduction of requested 137,500 acre feet.
4. Minimum figure represents a further 25% reduction in supply.

municipal and industrial users such as the District would begin to receive reductions as well. These reductions could be as high as 15%.

The District initially requested delivery of 137,500 acre feet from the U.S. Bureau of Reclamation San Felipe Division for 1989. At the January Central Valley Project Water Users Conference, Bureau of Reclamation staff indicated that they could not provide a water supply forecast with any high confidence level. At that time, they indicated that a continuation of 90% probability runoff figures for January through April could result in deliveries at the 75% level. However, the Bureau recently informed the District that its request will be reduced by 50%, in accordance with the Bureau's overall reduction of deliveries to Central Valley Project users. In light of the severe impact that the continuing drought and reduced San Felipe deliveries will have on Santa Clara County, the District is currently pursuing restoration of a portion of the 50% reduction.

Projected Hetch-Hetchy deliveries for 1989 total 50,000 acre feet. Santa Clara County retail water agencies receiving Hetch-Hetchy water have indicated that this figure could be reduced an additional 25% to about 38,000 acre feet.

The total available supply for Santa Clara County in 1989 is projected to be about 43,000 less than in 1988 assuming that the District experiences a 50% reduction in San Felipe deliveries, a 15% reduction in State deliveries, and Hetch-Hetchy deliveries of 50,000 acre feet.

The distribution of water in 1989 includes a projected treated water delivery of about 125,000 acre feet. The 20,000 acre feet increase over 1988 represents deliveries from the Santa Teresa Water Treatment Plant which went on line in February 1989.

The projected total controlled groundwater recharge for 1989 is about 27,000 acre feet. This is almost 47,000 acre feet less than was recharged in 1988, and represents less than 25% of controlled recharge capacity.

LOCAL GROUNDWATER CONDITIONS

Groundwater Level Trends

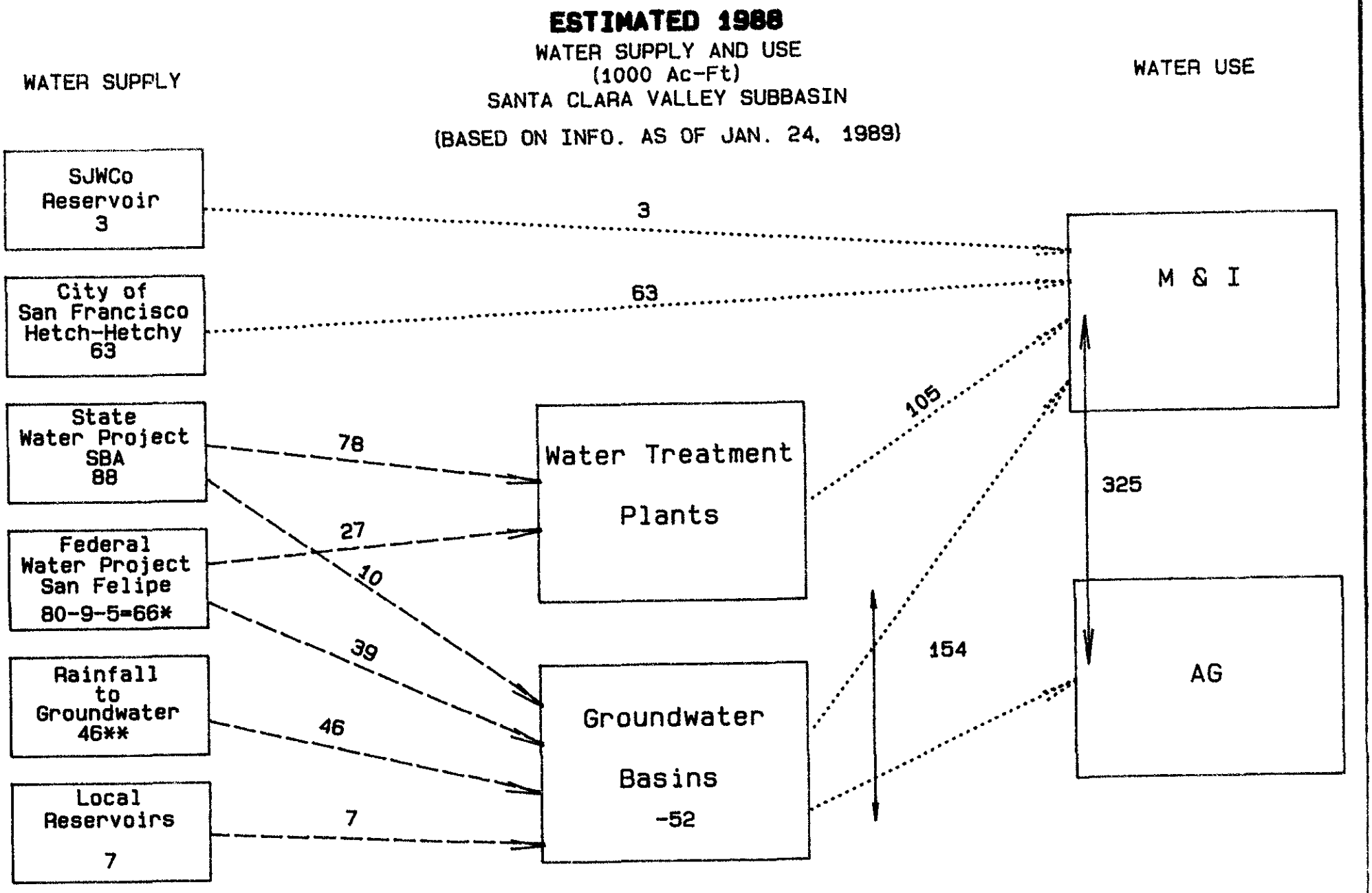
The groundwater subbasins have experienced two consecutive years of overdraft in the water years 1986-87 and 1987-88. The depth-to-water measurements in the index wells of all three subbasins have been lower in both 1987 and 1988 than the historical average. Graphs of depth-to-water for these index wells are shown in Appendix A. In the Santa Clara Valley Subbasin, fourteen wells have been within ten feet of or below the lowest level in 1968 or 1969. In most parts of the Santa Clara Valley Subbasin, groundwater levels are lower than in the 1976-77 drought.

1988 Usage

Estimated water supply and use in the Santa Clara Valley Subbasin for calendar year 1988 are illustrated in Figure 7. It is estimated that the groundwater basin was overdrafted by 52,000 acre feet in 1988 due to minimal local surface water supply.

Extraction Limitations and Land Subsidence

At this time it is estimated that only 30,000 acre feet can be overdrafted from the Santa Clara Valley Subbasin in 1989 without some significant impact on the basin. The USGS compaction well located in downtown San Jose and the cross valley level circuit indicate that 1969 was the last year of noticeable land surface subsidence. However, as shown in Figure 4, minor amounts of subsurface compaction have been measured at the USGS compaction well in each of the past five years, and there have been other indications of subsidence in the Alviso area. Continuing current levels of groundwater extraction in the Santa Clara Valley Subbasin could trigger land surface subsidence.



* 5 TO LLAGAS SUBBASIN

** 9 TO COYOTE SUBBASIN
INCLUDES SUBSURFACE INFLOWS
NUMBERS ARE ESTIMATED VALUES

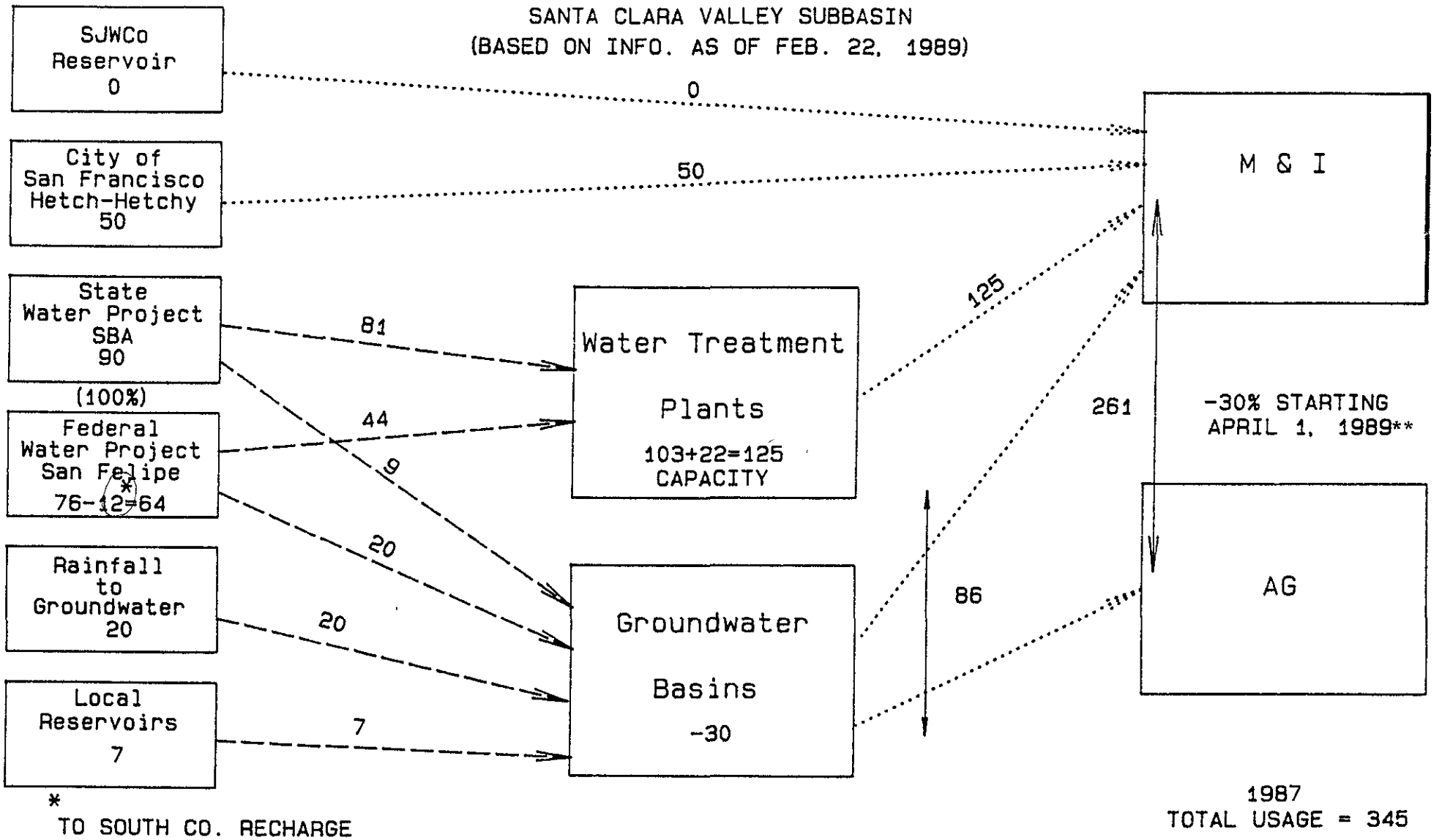
FIGURE 7

Projected 1989 Usage

Given the cumulative overdraft and the potential for land surface subsidence, groundwater extraction must be reduced in 1989. Projected water supply and use in the Santa Clara Valley Subbasin for 1989 are shown in Figures 8 and 9. Figure 8 assumes moderate imported water reductions, more natural recharge, and more artificial recharge in north county areas. Figure 9 assumes severe imported water reductions, less natural recharge, and less artificial recharge in north county areas. If minimal local rainfall and watershed runoff do occur as in 1988, and if imported supplies are reduced as projected, a 45% reduction from 1987 use beginning April 1, 1989, should keep groundwater levels in the Santa Clara Valley Subbasin at or above levels at which subsidence could occur.

PROJECTED 1989-REPEAT OF 1988 HYDROLOGY

HALF OF CONTRACT MAX. FROM SAN FELIPE
100% FROM SBA
WATER SUPPLY AND USE
(1000 Ac-Ft)
SANTA CLARA VALLEY SUBBASIN
(BASED ON INFO. AS OF FEB. 22, 1989)



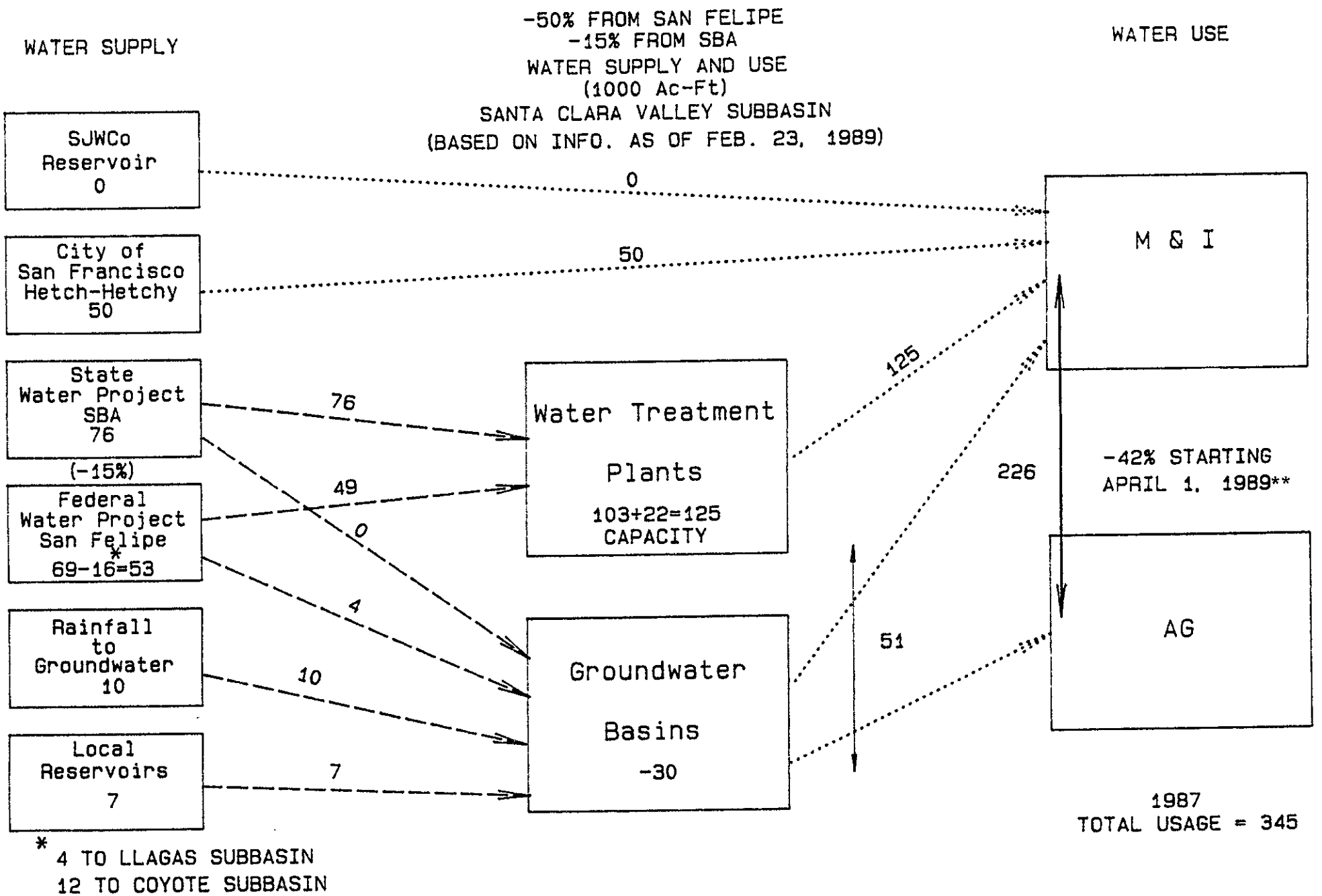
* TO SOUTH CO. RECHARGE

FIGURE 8

** ASSUMES 5% CONSERVATION FOR JANUARY, FEBRUARY AND MARCH 1989

PROJECTED 1989-REPEAT OF 1988 HYDROLOGY

-50% FROM SAN FELIPE
-15% FROM SBA
WATER SUPPLY AND USE
(1000 Ac-Ft)
SANTA CLARA VALLEY SUBBASIN
(BASED ON INFO. AS OF FEB. 23, 1989)



* 4 TO LLAGAS SUBBASIN
12 TO COYOTE SUBBASIN

FIGURE 9

** ASSUMES 5% CONSERVATION FOR JANUARY, FEBRUARY AND MARCH 1989

PUBLIC INFORMATION

In April 1988 the District asked water retailers and the public to voluntarily reduce water use 15% from 1987 levels effective May 1. An overall 3% reduction was achieved.

The District's 1988 water conservation program included a $72,000 media campaign, distribution of 50,000 water conservation kits and more than 5,000 table tents to local restaurants. A $62,000 contract with Brown and Caldwell extended the City of San Jose's industrial water audit programs.

The conservation programs of the various water retailers and cities ranged from providing drought information and water conservation suggestions with water bills, and installation of water conservation kits, to regulating water waste inverted rate structures.

The overall response by the public, industry and public agencies did not meet the District's conservation goal. Although no single factor can pinpoint this lack of cooperation the following probably contributed:

- The public did not receive a clear message as to the seriousness of the situation.

- The District has an ongoing water conservation program, but the stepped up campaign may have begun too late to be effective. Water use in January and February of 1988 was above average, and the campaign did not start until May.

- The District did not offer any incentives to encourage water conservation.

- A certain level of conservation has already been met beyond which more extensive conservation cannot easily be reached voluntarily.

East Bay Municipal Utility District spent more than $850,000 on a water conservation campaign in 1988 and that, coupled with an inverted rate structure, enabled them to surpass their 25% conservation goal.

Faced with a water reduction target for 1989 of 45%, the Santa Clara Valley Water District's Board of Directors approved a $500,000 contract with PRx Incorporated on February 14. The contract provides for an extensive water conservation media campaign to educate the public about Santa Clara County's water supply system, the need to conserve water, and ways to achieve conservation. This 1989 campaign, in conjunction with other staff recommendations, is aimed at reducing water consumption during the drought and at encouraging long-term conservation programs.

Appendix B contains details of the District's 1988 water conservation campaign and expenditures, as well as a summary of measures implemented by other local agencies.

CONCLUSIONS

- Even if maximum imported resources were available in 1989 (278,000 acre feet) and 1988 hydrology was repeated, anticipated water needs cannot be met without substantial groundwater overdraft or a major conservation effort.

- 1989 imported water supplies to Santa Clara County from all sources will most probably range from 183,000 to 255,000 acre feet.

- As of the date of this report, the local surface water supply is at the lowest level ever experienced, about 12,000 acre feet, or slightly under 7% of our total reservoir capacity.

- As of March 1, local rainfall is about 53% of average, and below the amount recorded for the same period in 1988.

- Overall groundwater levels in the Santa Clara Valley Subbasin are in a downward trend and have been since 1983.

- Groundwater production must remain in relative balance with recharge from year to year in order to prevent overdrafting.

- Continually declining groundwater levels are related to subsurface soil compaction and subsidence.

- A recurrence of subsurface compaction has been observed in the San Jose USGS compaction well since 1983.

- Local surface water and groundwater supplies are dependent on local rainfall and runoff.

- Local and imported water resources are unable to meet increasing needs during prolonged periods of drought.

- The overall 1988 water reduction goal of 15% below 1987 usage was not achieved. Actual reduction was about 3%.

- The 1988 water conservation campaign did not begin in time to adequately prepare the public to meet conservation goals.

- A more aggressive water reduction campaign is needed in 1989 to adequately address the need for a reduction in overall water use.

- Voluntary use reductions are not easily met without enforcement measures.

RECOMMENDED ACTION PLAN

The level or severity of the drought will not be fully known until April 1, when the State advises the District of the availability of imported supplies and local storage is known.

Given current weather, surface water and groundwater conditions, however, actions should be taken to prepare for a 45% countywide reduction from 1987 levels of water use as shown in (3) below.

Water Use Reduction
Starting April 1, 1989

	Status of Imported Supplies	Reduction Required
(1)	Full SBA and San Felipe	15%
(2)	12% SBA Reduction, 50% Ag and 25% M&I Reduction of San Felipe	30%
(3)	15% SBA Reduction and 50% Reduction of San Felipe	45%

Immediate Action Plan (Feb. 1-28, 1989)

District:
- Conduct hearing on and adopt final drought plan.
- Hire public information firm.
- Prepare press releases.
- Report on status of local and imported resources.
- Develop water pricing strategy to encourage conservation.
- Conduct water audits with City of San Jose.
- Begin local bus advertisements.
- Meet with Bay Area water agencies on combined news media program.
- Prepare tape with California Irrigation Management Information System (CIMIS) information.

Water Retailers:
- Develop water use reduction programs.
- Advise customers of drought status.
- Encourage continued conservation.

Cities:
- Draft water waste and reduction ordinances and enforcement plans.

Intermediate Action Plan (March 1-31, 1989)

District:
- Begin media campaign to inform public of severity of the drought.
- Distribute water conservation information.
- Distribute water conservation kits.
- Press releases and conferences.
- Presentations to elected officials.
- Develop plan to monitor algal blooms and other water quality impacts.

Water Retailers:
- Finalize water use reduction programs.
- Keep customers advised of drought status.
- Install water conservation kits.

Final Action Plan (April 1, 1989, - on)

District:

- Adopt final conservation level in concert with water retailers for implementation on April 1.
- Implement full scale media program.
- Adopt incentive rate structure to encourage water use reduction planning and evaluate benefits of cost sharing programs.
- Take readings on cross valley level circuit.

Water Retailers:

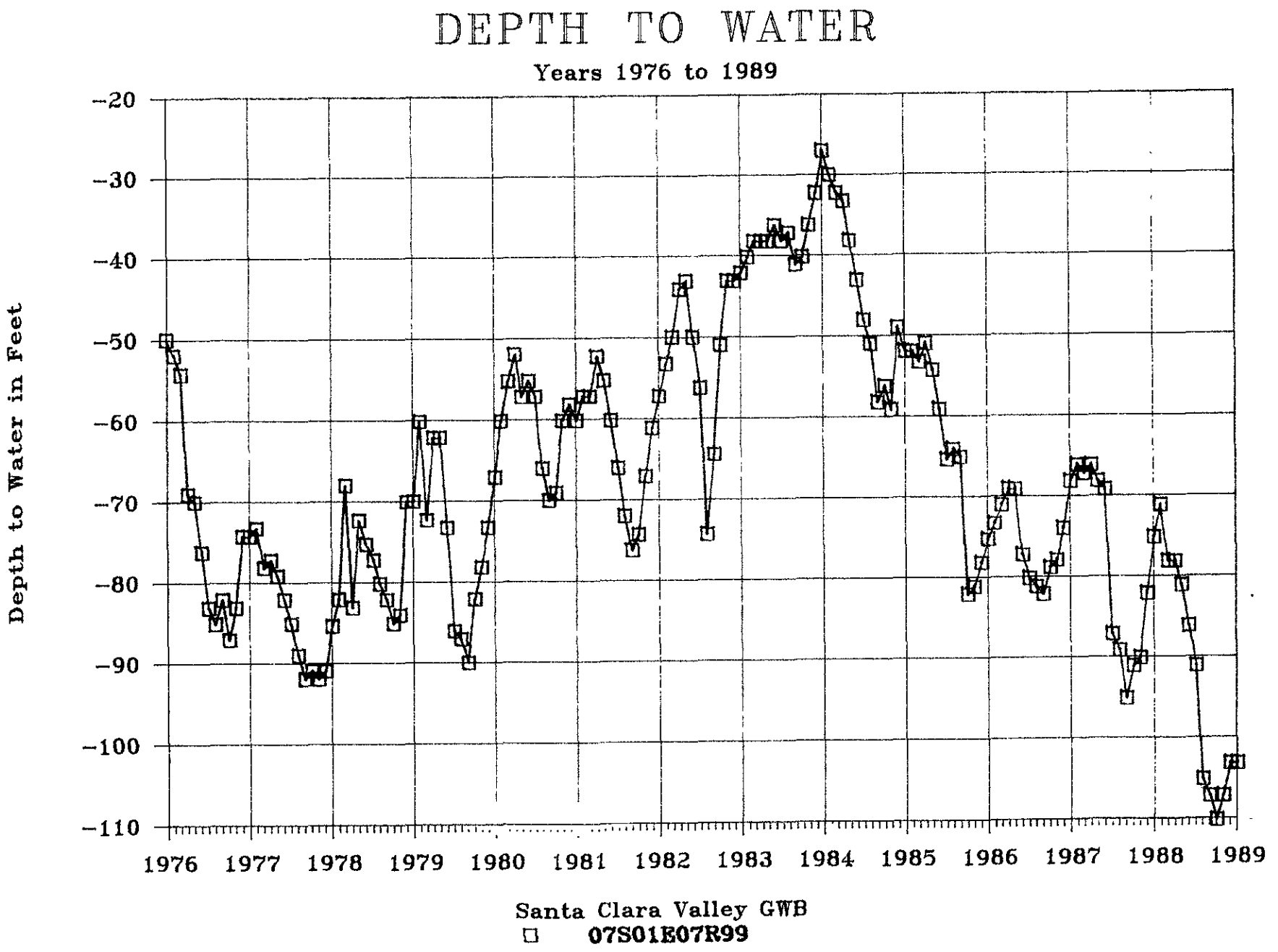
- Implement water use reduction program appropriate to level required.
- Advise customers of drought status.

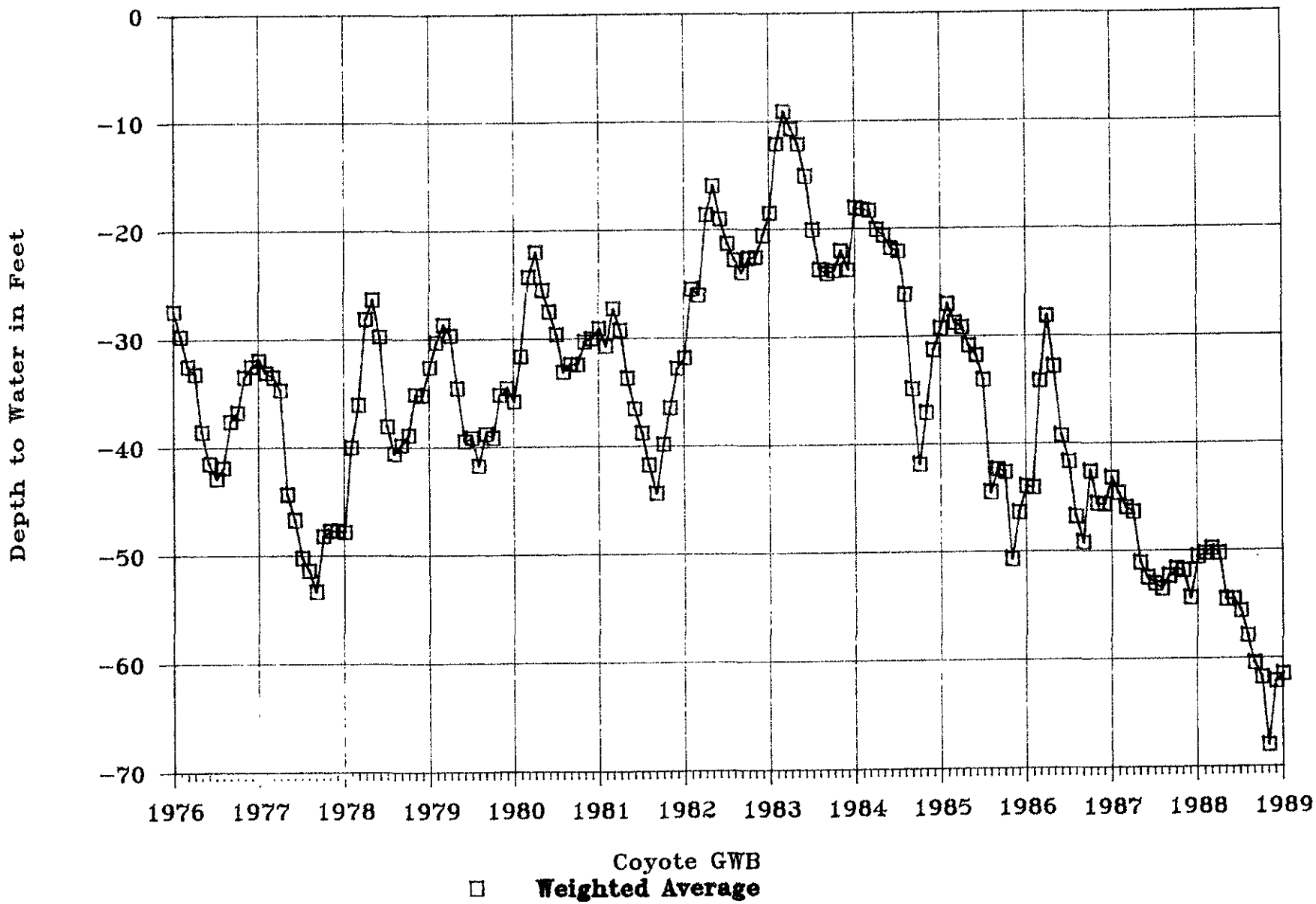
Cities:

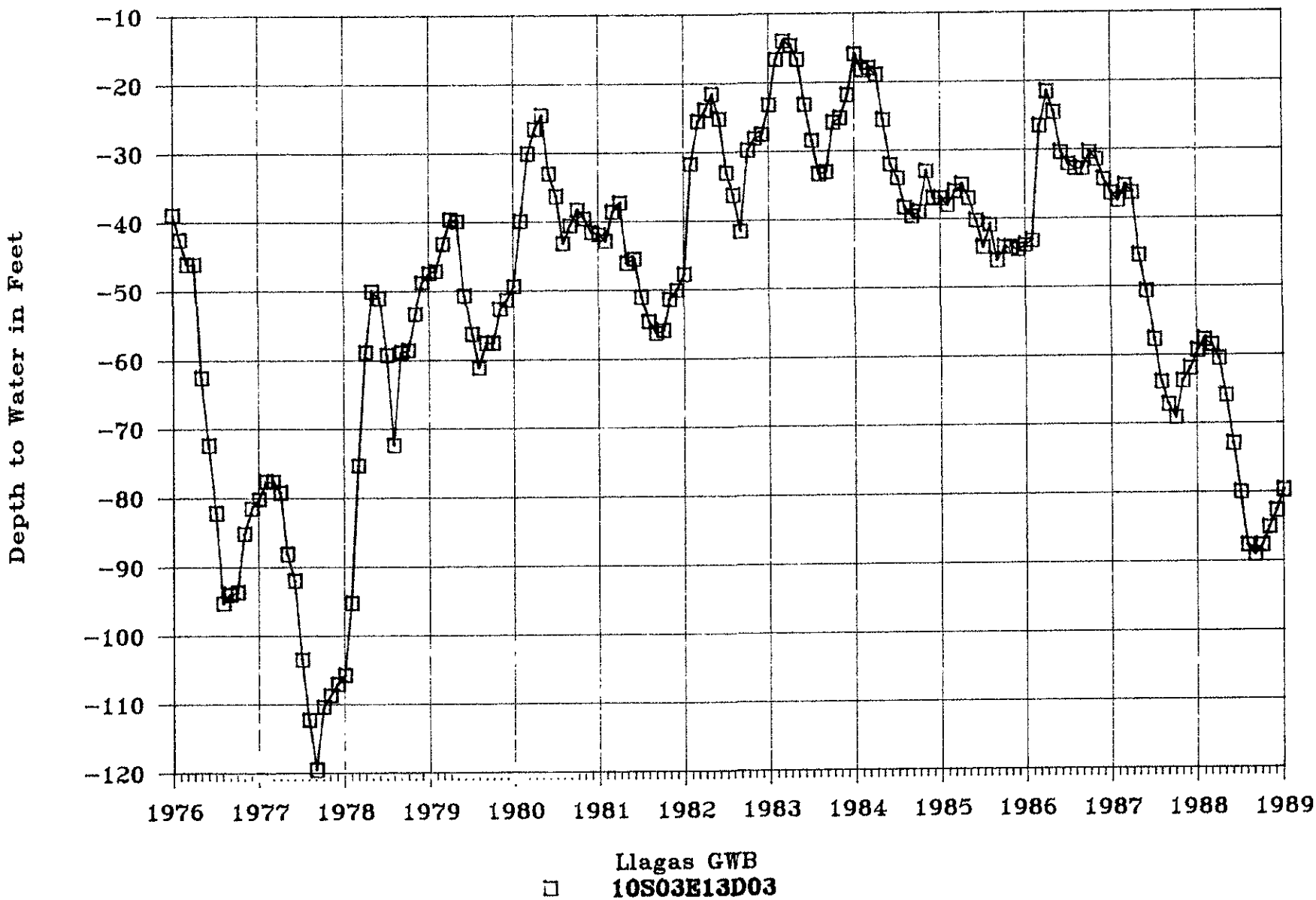
- Adopt and enforce water use reduction ordinances.
- Enforce water use reductions at city parks and recreation areas.

APPENDIX A

GROUNDWATER LEVEL TRENDS


DEPTH TO WATER
Years 1976 to 1989
Depth to Water in Feet
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
Santa Clara Valley GWB
07S01E07R99


0
-10
-20
-30
-40
-50
-60
-70
Depth to Water in Feet
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
Coyote GWB
Weighted Average


-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Depth to Water in Feet
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
Llagas GWB
10S03E13D03

APPENDIX B

SUMMARY OF 1988 WATER CONSERVATION PROGRAMS OF DISTRICT AND OTHER AGENCIES

1988 Water Conservation in Santa Clara County

After the Board's decision on April 27, 1988 to ask for voluntary water conservation of 15 percent county wide, the district public information office began to step up its campaign to publicize the need for conservation.

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1. A news release was given to the newspapers, radio and television stations letting them know that the district's board was asking for this conservation and that the water district had conservation kits and literature available free for the public.

2. This news release generated telephone requests for water district conservation kits from the general public, from cities in the county wanting to distribute the kits in their respective areas and from realtors who wanted the kits for their neighborhood canvassing. More than 50,000 kits were distributed from April to October. Distribution also continues to school children taking tours of district facilities, and the public information staff gives kits when making speeches for groups such as Kiwanis clubs and homeowner's associations.

3. The news release also generated requests for printed materials. These items include a brochure on ways to save water inside and outside the home, a lawn watering guide, and various water saving leaflets including a drought tolerant plant guide.

4. A letter was sent to nurseries in the county encouraging them to distribute the district's lawn watering guide at their counters. Between April and October more than 5,000 guides were sent to nurseries upon their request.

5. A letter was sent to restaurants in the county encouraging them to serve water only upon request. A table tent is available for display on individual restaurant tables. The table tent explains why water is being served only upon patron request. From April to October more than 5,000 table tents were requested by restaurant owners.

6. A"water waster" letter was developed and is sent to water wasters when the public information office receives calls of complaint from the public. The letter simply tells the offending party that we do need to conserve and suggests ways they might do so.

7. Bumper stickers are distributed in district facility tours and presentations before community groups.

8. The district spent nearly $72,000 on media advertising in newspapers, on the radio, on television, in theaters and on billboards.

a. In cooperation with the city of San Jose a radio jingle and television spot were aired on stations KRON, KPIX, KNTV, Bay Area cable, KBAY, KEEN, KWSS, KOME, KATZ from Aug. 1 to Sept. 1.

b. Newspaper ads ran through the month of September in the Los Gatos Weekly, Sunnyvale's Santa Clara Valley Journal, Morgan Hill Times, Milpitas Post, Peninsula Times, Mercury News, Saratoga News, Los Altos Town Crier, San Jose's Santa Clara County El Observador, Cupertino Courier, Gilroy Dispatch, Potpourri, Construction Labor News, Palo Alto Weekly, and Los Gatos Times Observer.

c. Through the end of November billboards in several locations throughout the county displayed a water conservation message.

d. For 13 weeks in 30 theaters water conservation slides were shown.

9. In cooperation with the state Department of Water Resources the district contributed to the installation of a CIMIS station (California Irrigation Management Information System) in San Jose and is in the process of setting up a message recorder to retrieve inforamtion from the station and make it available to irrigators. This program is just beginning and includes a pilot landscape water auditing program in conjunction with the city of San Jose's outdoor water audit program. The pilot program is to be conducted by Brown and Caldwell, and the district has authorized support in the amount of $62,000.

10. The district contributed to the production of a 32-minute film on outdoor water conservation by Sunset Magazine. Copeis of the film are available and are checked out to cities, garden clubs, cable TV stations, etc. upon request.

Conservation Steps Taken by Other Agencies

The water district is aware that water retailers have taken steps to encourage their customers to conserve.

Nine cities in the county: Campbell, Cupertino, San Jose, Los Altos Hills, Los Gatos, Milpitas, Palo Alto, Santa Clara and Sunnyvale adopted resolutions or ordinances regarding water conservation.

Water conservation leaflets were distributed by retailers in water bills.

The city of Mountain View produced various water conservation materials and distributed them door to door to homeowners and businesses in their city. These materials included a commercial/industrial water use guide and a guide for restaurants. And they set an example by using water conservation in their own city landscapes. They also picked up water saving kits from the district for distribution in their city.

Milpitas distributed district conservation kits and charged their customers more for water when they used above their allotted amount. After reviewing information on their watercustomers who paid excess use charges this summer, Milpitas noted that irrigation water customers paid approximately one-third of the total excess use charges. To help irritgation customers determine how much water is needed for their landscaping, Milpitas sent a brochureaddressing this to their customers. They also have a water conservation hotline for customer's convenience.

Palo Alto distributed district kits and other conservation materials. They have a "gutter flooder" ordinance allowing them to fine people for wasting water. They also developed a commercial/industrial water use guide and a guide for restaurants.

The city of Santa Clara passed a resolution on implementing a water conservation program for 1988/89 with the intent of a net reduction in water use of 25 percent based on the 24 months immediately preceding implementation of the program. The program includes fines for water wasters. Santa Clara also distributed district conservation kits and water saving brochures of their own.

The city of San Jose has a retrofit program and is distributing kits to every household in the city. The kits are for conservation inside the home. They also have an industrial program and with the assistance of Brown and Caldwell, consultants, they are auditing businesses to reduce industrial water use. They are just beginning to address outdoor water use and have a contract with Brown and Caldwell for this program. In the municipal water service area water restrictions have been imposed on landscaping and on industrial water use.

Morgan Hill formed a volunteer water conservation committee in the summer of 1988 and delivered water conservation kits door to door in their community. They also held a poster contest for schools.

Sunnyvale continues to push for conservation from its citizens thorugh an active public awareness campaign which includes bill stuffers and distribution of conservation kits and other conservation literature.

APPENDIX C
MODEL DROUGHT ORDINANCE
AND
WATER USE REDUCTION GUIDELINES

I. Drought Ordinance Background

II. Model Drought Ordinance Guidelines

III. Definitions for Water Use Reduction Ordinances

IV. Water Use Reduction Rates: Residential and Non-Residential

V. Water Use Reduction Actions for All Public and Private Water Agencies

VI. Water Use Reduction Actions for All Non-Residential Users

VII. Water Use Reduction Actions for All Agricultural Users

VIII. Water Use Reduction Actions for All Water Users

I. Drought Ordinance Background

Presently there are eight cities within the County of Santa Clara that have adopted a resolution or ordinance regarding water conservation. These cities are Campbell, Cupertino, Los Altos Hills, Los Gatos, Milpitas, Palo Alto, Santa Clara and Sunnyvale.

The remaining seven cities and the County of Santa Clara have not to date adopted resolutions or ordinances regarding water conservation. These cities are Gilroy, Morgan Hill, Mountain View, San Jose, Monte Sereno, Saratoga and Los Altos.

The purpose of this Appendix C is to identify significant categories of water use reduction measures contained within existing ordinances or resolutions on water conservation, and to recommend that the remaining cities and the County use this information to design their own ordinances or resolutions.

In particular, Section II (Model Drought Ordinance Guidelines) contains ordinance elements which are considered critical to the success of achieving 1989 water use reduction goals. The list was developed by joint effort of District staff and the Water Supply Subcommittee of Retail Water Agencies, and is substantially in compliance with measures recommended by the California Public Utilities Commission and the State Department of Water Resources.

Rate structures and allocation plans developed by retail water agencies are really only half of the program necessary to achieve 1989 water use reduction goals. These programs must be backed up by city and County ordinances which prohibit waste of water or use of water for non-essential purposes during periods of severe drought.

The goal is to reduce water use as equitably as possible throughout the County. In order to do this, all cities and the County are urged to consider adopting consistent drought ordinances that contain the elements outlined in Section II of this Appendix C.

II. Model Drought Ordinance Guidelines

(Approved by the Water Supply Subcommittee of Retail Water Agencies.)

Water Uses Prohibited:

1. Water waste, including but not limited to, flooding or runoff on sidewalks, streets or gutters.
2. Cleaning of sidewalks, driveways, patios, parking lots, or other paved or hard-surfaced areas.
3. Use of water through a hose for washing cars, buses, boats, trailers, or other vehicles without a positive automatic shutdown valve on the outlet end of the hose.
4. Operation of decorative fountains.
5. Use of water for construction purposes, such as consolidation of backfill, unless no other source of water or other method can be used.
6. Water waste due to broken or defective plumbing, sprinkler, watering or irrigation systems.
7. Outside landscape irrigation during daylight hours.
8. Restaurant water service unless upon request.

Additional Water Uses Prohibited (45% Water Use Reduction):

1. New irrigation services or landscaping.
2. New pool or pond construction.
3. Filling or refilling of pools.
4. Hydrant flushing, except where required for public health or safety
5. Outdoor watering from December to March.
6. Turf watering, except for specified areas for organized sports. (District's Board recommends elimination of the exception.)
7. Golf courses, except for tees and greens.
8. Single pass cooling process on new construction.

III. Definitions for Water Use Reduction Ordinances

Residential Use:

Interior use shall be defined as the average monthly water use during the months of December, January, February and March of the 24 month period immediately preceding the implementation of this ordinance. Exterior use shall be the monthly water use which exceeds the average monthly interior use as previously defined, and shall include landscape irrigation, vehicle washing, swimming pool filling, pond filling, etc.

Non-Residential Use:

Interior use shall be defined as all water use inside buildings and structures, including water used in air scrubbers, cooling towers, acid neutralization, or any water used in connection with a manufacturing process. Exterior use shall be defined as all water used for landscape irrigation, vehicle and equipment washing or cleaning of the exterior portion of any building, parking lot, etc.

IV. Water Use Reduction Rates: Residential and Non-Residential**

1. All water users shall employ appropriate water use reduction measures so as to reduce the overall water use by 45% of that used during April through December 1987.

2. All water users shall employ appropriate water use reduction measures to reduce the amount of potable water consumed for exterior uses by 60% of that used for the same purpose during April through December 1987.

3. All water user's shall employ appropriate water use reduction measures to reduce the amount of potable water consumed for interior use by 30% of that used for the same purposes during April through December 1987.

**Final Water Use Reduction Rates to be determined on or about April 1, 1989.

V. Water Use Reduction Actions for All Public and Private Water Agencies

1. Reduce or eliminate irrigation at parks, and all other landscape areas.

2. Install moisture sensing devices to detect any moisture in the air which will then turn off automatic sprinkler systems.

3. Initiate aggressive public information campaign:

   A. Explain drought situation to the public and governmental bodies. Explain stages and forecast future actions. Request voluntary water conservation.

   B. Prepare and disseminate educational brochures, bill inserts, etc. Disseminate technical information to specific high water users on ways to save water.

   C. Coordinate media outreach program. Issue news releases to the media. Begin advertising campaign to remind consumers of the need to save water.

   D. Recruit and train employees on water use reduction. Prepare volunteers for speaker's bureau.

   E. Set up public information booths urging water use reduction and demonstrating ways public can reduce water use.

4. Institute rate structures to reduce water use. Explain new rate schedules to customers.

5. Implement retrofit program similar to that used by the City of San Jose. Advertise availability of retrofit.

6. Increase efficiency of system water supplies, e.g.
   - enforce hydrant-opening regulations.
   - increase meter reading efficiency and meter maintenance.
   - intensify leak detection and repair program.

7. Implement water rationing program through fixed allotments or percentage cut backs.

V. <u>Water Use Reduction Actions for All Public and Private Water Agencies (continued)</u>

8. Require all existing homes and businesses to have retrofitted showers and toilets within 3 months time. Make retrofit kits available to all customers through depot or installation programs.

9. Implement penalties for excess water use.

10. Reduce or eliminate water used for street cleaning and main flushing.

11. Reduce or eliminate landscape irrigation at all cemeteries.

12. Maintain an aggressive leak detection and repair program.

13. Repair leaking plumbing fixtures within public facilities.

14. Test and repair source and customer meters for better water accountability.

15. Contact major water users (industry, school districts, athletic facilities, golf courses, etc.) and advise them of water use reduction practices and new rate structures.

16. Turn off ornamental fountains and other highly visible water luxuries during drought conditions.

17. Reduce or eliminate fairway watering at all golf courses; reduce irrigation of golf course tees and greens to a minimum.

18. Restrict the filling or refilling of public and private swimming pools.

19. Cover pools when not in use to reduce evaporation and heat losses.

20. Prohibit restaurants and other food establishments from routinely providing glasses of water unless specifically requested by the customer.

21. Install automatic turn-off valve in public restrooms.

V. Water Use Reduction Actions for All Public and Private Water Agencies (continued)

22. Discontinue vehicle washing except for medical or sanitary reasons, e.g. food delivery or medical vehicles.

23. Eliminate the cleaning of paved surfaces with water.

24. Eliminate fire hydrant use by municipal road crews or contractors if non potable source is available.

25. Impose fines for illegal hydrant openings.

26. Post water conservation notices near all water sources such as water fountains and sinks.

27. Install flow restrictors on hoses and faucets.

28. Require water saving devices installed on the interior plumbing fixtures of all new construction.

29. Monitor customers for compliance of the adopted ordinance by utilizing existing (or new) city/staff employees whose daily routine work requires them to be moving about the community, example: building inspectors, water department field personnel, health service personnel, etc.

30. Reduce or eliminate watering within internal city departments (e.g. Parks and Recreations, highways, libraries, fire fighting facilities, etc.)

31. Institute landscape planning practices that emphasize minimal water use and drought tolerant plant materials.

32. Utilize reclaimed water wherever feasible.

33. No new landscaping or expansion or existing landscape.

34. No draining or filling of swimming pools.

VI. Water Use Reduction Actions for All Non-Residential Users

1. Initiate in-house water use reduction program.

2. Assign water use monitors.

3. Read the water meter weekly to determine the effect of water use reduction.

4. Install toilet dams and low flow showerheads in employee restrooms.

5. Reduce water flows in industrial processes.

6. Turn off water to rooms and building areas not in use.

7. Install recycling systems for chilling and cooling towers.

8. Re-use water supplies when appropriate.

9. Discontinue continuous flow processes when possible.

10. Eliminate continuous flow window and building cleaning.

11. Instruct cleaning crews to be frugal with water.

12. Provide paper cups to reduce water use at water fountains.

13. Replace worn-out water-using appliances with newer, more efficient models.

14. Recycle rinse water.

15. Sweep shop floors rather than hosing them.

16. Reduce fresh water used for cooling and air-conditioning systems (e.g. raise office air temperatures).

17. Use reclaimed waste water for landscape watering.

VI. Water Use Reduction Actions for All Non-Residential Users (continued)

18. Use reclaimed waste water for industrial processes.

19. Check water hose couplings weekly for leaks.

20. Ensure that solenoids and valves controlling water flows are completely closed when the water-using cycle of a machine or process is not in operation.

21. Adjust flushometers and automatic flush valves to utilize the minimum amount of water necessary.

22. Check for and repair all leaks.

VII. Water Use Reduction Actions for All Agricultural Users

1. Improve land grading, particularly using laser leveling.

2. Install irrigation return flow systems.

3. Use sprinklers or drip irrigation systems on appropriate crops.

4. Control weeds and other phreatophytes.

5. Use gated pipe, lined ditches, or pipelines instead of earth-lined ditches.

6. Monitor soil moisture to be more precise in pre-irrigations and to properly schedule timing and amount of irrigation water application.

7. Use information on the water use of various crops and determine whether deficit irrigation would be feasible.

8. Reduce furrow run lengths, particularly on coarse-textured soils.

9. Develop and implement an efficient on-farm management program with the following goals:
   a. Evaluate existing irrigation systems;
   b. Improve irrigation efficiency and distribution uniformity;
   c. Reduce subsurface drainage contribution;

10. Grow crops that require less water.

Copies of the California Department of Water Resources' "Agricultural Drought Guidebook" are available from the Santa Clara Valley Water District (408-265-2600).

VIII. Water Use Reduction Actions for All Water Users

1. Repair broken or defective plumbing - leaky faucets, toilets, sprinkler, and irrigation systems.

2. Reset all automated sprinkler systems to operate during non-daylight hours and for shorter duration.

3. Eliminate water to clean sidewalks, driveways, or any paved or impervious surfaces.

4. Use a positive shut-off valve on hoses to save water while watering plants or washing automobiles or boats.

5. Eliminate allowing any water to run into the gutter.

6. Wash only full loads in the washing machines or dishwasher.

7. Use a swimming pool cover when the pool is not in use in order to reduce evaporation.

8. Do not mow lawns too short; taller grass retains moisture better.

9. Take shorter showers or shallower baths.

10. Turn off the water while brushing teeth, shaving, preparing food, washing hands, etc.

11. Do not flush toilets needlessly or use the toilet as a waste basket.

12. Use garbage disposals sparingly.

13. Keep a bottle of drinking water in the refrigerator; this saves running the tap to get cooler water.

14. Adjust all water-using appliances to use the minimum amount of water necessary.

15. Use low-sudsing detergents; they clean just as well and require less water to rinse.

VIII. Water Use Reduction Actions for All Water Users (continued)

16. Position lawn and irrigation sprinklers carefully; do not water sidewalks or streets.

17. Follow landscaping irrigation and design guidelines to water lawns and plants only when necessary.

18. Landscape with drought resistance plants. (ref. Sunset Magazine, October, 1976).

19. Put plastic bottles in your toilet tank.

20. Install water-saving showerheads or flow restrictors.

21. Surround plants with rocks or mulch to retain soil moisture.

22. Tell your children not to play with hose or sprinklers.

23. Always observe good water conservation practices.

Copies of the California Department of Water Resources' "Urban Drought Guidebook" are available from the Santa Clara Valley Water District (408-265-2600).